Hypothesis Concerning Superconducting Properties of Uranium Ditelluride and Role of Spin Triplets

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Introduction

According to Helmholtz Zentrum Dresden Rossendorf (HZDR) and their publication of 31 January 2024, spin triplets may play an important role in unconventional superconductivity. Although the presence of spin triplets in UTe2 is undeniable, Helmholtz Zentrum has erroneously jumped to the conclusion that because there are spin triplets that the triplets must be the cause of the superconductivity.

Abstract

Those already familiar with my previous work would be aware that uranium has unique properties related not only to heat generation, but with respect to the maintenance of heat which may be term *thermal inertia.* Whereas most materials will eventually cool to near absolute zero even without sufficient IR emission at such low temperatures to explain the sort of cooling that occurs in the vacuum of space (this may be termed a fourth form of cooling, ibid.) uranium not only generates heat as a result of decay but does not experience this fourth form of cooling.

The fourth form of cooling is the result of the steady influx of neutrinos (or gravitational energy, if you prefer) toward nuclei. Every atom has its own microgravity and these gravitational neutrinos, although their interaction is minimal, is sufficient to negate some of the oscillatory motion of nuclei associated with thermal energy. For the same reason that objects at rest tend to stay at rest, a nucleus which is oscillating due to the presence of thermal energy will tend to experience a petering out of that activity as a result of asymmetry of the microgravitational field generated by the protons in any given nucleus. This field will tend to be centered upon the average position of the nucleus and the nucleus is therefore nudged back toward center each time it leaps out of the average position. Although subtle, these forces cumulatively result in the cooling effects we associate with objects spending prolonged periods of time in, for example, the shadow cast by the moon at the L2 Lagrange point.

Uranium is unique in that its nucleus is so large and its electrons so numerous that its nucleus makes a sufficiently close approach to its electron cloud with its thermal oscillation that Coulomb attraction negates 100% of the neutrino-influx cooling effect and, in fact, produces the opposite effect. For decades, researchers have erroneously concluded that the high temperature of uranium is the result of decay however, although decay does generate modest heating, most of the warmth associated with uranium is the result of proximity-induced

Coulomb Attraction between the positively charged nucleus of uranium and its electron cloud.

That said, when one considers the dynamics of spontaneous light emission by atoms as conceived of by this author (ibid.,) it is plain to see how these close approaches of uranium nuclei to electron clouds can effect the spin orientation of electrons.

HZDR researchers pointed out that UTe2 is able to maintain the superconductive state at up to 1.6 Kelvin and at magnetic field strengths of over 70 teslas. The reason for this is that uranium's influence on electrons prevents the transmission of these powerful fields (at least up to a certain point) by continually re-randomizing the spin orientations of electrons and thus preventing the sort of organized alignments associated with magnetization. In the metaphor of a bullet fired on a windy day, the magnetism is rather like bullets and the Coulomb repulsions of the oscillating uranium nuclei are like whirlwinds. Generally speaking, firing a bullet at an unusually high velocity will maximize accuracy by mitigating the relative influence of the wind and reducing overall flight time and thus exposure to the influence of the wind. In the case of UTe2, the uranium's motion introduces such a great degree of turbulence that this turbulence is translated indirectly into the tellurium atoms' electron clouds.

Conclusion

While it is the tellurium that is conducting (and superconducting) the electrons in UTe2, magnetic turbulence in the electron clouds of the uranium indirectly imposed upon the tellurium atoms' electron clouds is the cause of the unique properties discovered by HZDR. The spin triplets are the result of narrow channels of strong magnetism seeping through the structures of the layered material and influencing the spins of the electrons. It is symptom of the limitations of the magnetism-blocking effects of the uranium and not the cause of the superconductive behavior.